Interim Remedial Action Report

Parker Landfill Superfund Site, Lyndonville, Vermont

September 2006

I INTRODUCTION

A. Site Location and history

The Parker Landfill Superfund site (the Site), is located on Lily Pond Road in the southeast portion of the Town of Lyndon, Caledonia County, Vermont (Figure 1). The Landfill occupies approximately 25 acres of a 75 acre parcel on the southern side of Lily Pond Road, approximately 0.2 miles southeast of Lily Pond. As shown in Figure 2, the Landfill contains a Solid Waste Disposal Area (SWDA) and three smaller industrial waste areas (IWS) which have been consolidated and capped as a result of an April 1995 Record of Decision (ROD).

The surrounding area consists of mobile home communities and single family homes, as well as a combination of pasture land, agricultural land and woodlands. A private school and a nursing home are located .5 miles south of the Site. An unnamed stream traverses the Site and flows southwest to the Passumpsic River, which is located approximately 0.5 mile from the Site. The Passumpsic River has been classified as Class B which should be managed to maintain a level of quality compatible with good aesthetic value; high quality habitat for aquatic biota, fish, and wildlife; public water supply with filtration and disinfection; irrigation and other agricultural uses; swimming; and recreation.

The current Landfill was approved as a disposal facility for solid waste in 1971. Ray O. Parker & Sons, Inc. began operating the facility in 1972. Prior to 1972, the disposal area was used as a sand pit and a town disposal area.

The SWDA was used for the disposal of municipal solid waste and, at various times, industrial wastes. Operation of the SWDA continued until July 1992. The three industrial waste areas were used solely for the disposal of industrial wastes. These areas were used at various times between the years of 1972 and 1983.

Industrial wastes disposed at the Site included trichoroethene (TCE), sodium hydroxide, 1,1,1-trichloroethane (1,1,1-TCA), acetone, lacquer and stain sludge, paint sludge, tetrachloroethene (PCE), barium chloride, chromium and nickel plating rinse waters, polyester resin, mercury, electroplating sludge and water soluble coolants. Approximately 1,330,300 gallons of liquid industrial wastes and 688,900 kilograms of liquid, semi-solid, and solid industrial wastes were disposed of at the Site between 1972 and 1983.

In 1979, monitoring wells were installed by the Landfill operator. Routine monitoring of the Landfill by the Vermont Department of Environmental Conservation (VTDEC) revealed the presence of chlorinated volatile organic compounds (VOCs) in the groundwater and in the unnamed stream adjacent to the Landfill. Follow-up sampling detected VOCs above Federal Maximum Contaminant Levels (MCLs) in five private wells south of the Landfill. VTDEC subsequently installed additional monitoring wells and piezometers in 1984.

In 1985, the VTDEC informed four parties of their responsibility for performing investigative work and remedial actions at the Site. The parties initially declined and the Vermont Attorney General's office prepared to file a lawsuit against them. One of these parties (Vermont American Corporation) agreed to proceed with investigative and remedial actions and their contractor began a remedial investigation of one of the industrial waste areas in 1987. They installed wellhead treatment systems on five residential wells where contaminant levels exceeded MCLs, which operated until the residences were connected to the Lyndonville water supply.

The VTDEC completed a Preliminary Assessment/Site Evaluation in 1985, and EPA proposed the Site for listing on the National Priorities List on June 21, 1988; at which point investigative work ceased. On February 16, 1990, the Parker Landfill site was added to the National Priorities List.

B. Enforcement History

EPA identified 14 Potentially Responsible Parties (PRPs) at the Site. In 1990 EPA entered into an Administrative Order by consent with a subset of the PRPs for the Remedial Investigation/Feasibility Study (RI/FS). The RI was released on May 2, 1994. The FS was released on June 1, 1994. EPA issued the ROD in April of 1995. The response action specified in the ROD included the following: a cap over the SWDA and the three IWS areas, and a groundwater extraction and treatment system to contain contamination at the source and allow for the natural restoration of the downgradient aquifers.

In 1996, EPA and one party, Ethan Allen Corp. entered into an Administrative Order on Consent to perform the design for the landfill cap portion of the Remedial Action. In 1999, EPA, the VTDEC and Thirteen PRPs entered into a Consent Decree to construct and maintain the landfill cap portion of the Remedial Action. The remaining PRP, Vermont American Corporation (now owned by Robert Bosch Company), agreed to address the groundwater contamination through a Unilateral Administrative Order

(UAO).

No activities were conducted using removal authority at the Site.

C. Waste Characterization

The following sections describe the nature and extent of contaminants that were detected in the areas investigated during the Remedial Investigation.

Soil

Elevated concentrations of VOCs, semi-VOCs and inorganic contaminants at the landfill were detected in surface and subsurface soils collected from the IWS areas. The highest contaminant concentrations were detected in IWS-2 area soils. Contaminants in IWS area soils included 1,2-dichloroethylene (1,2-DCE), TCE, and polycyclic aromatic hydrocarbons (PAHs). The SWDA was estimated to contain approximately 2 million cubic yards of waste and is approximately 55 feet deep, on average. The RI/FS assessment results indicated that the IWS areas, due to their history of accepting industrial wastes, were serving as additional discrete source areas from which the VOCs which were leaching into Site soils and groundwater.

Groundwater and Residential Wells

Groundwater samples from overburden and bedrock monitoring wells at and around the landfill contained a variety of VOCs, SVOCs and inorganic contaminants. Monitoring wells beneath the source areas contained some contaminants at concentrations exceeding Federal and/or State safe drinking water standards, including 1,1,1-TCA, 1,1-dichloroethylene (1,1-DCE), 1,2-DCE, benzene, methylene chloride, TCE, PCE, toluene, vinyl chloride, bis(2-ethylhexyl) phthlate, antimony, arsenic, beryllium, lead, cadmium, manganese, and nickel. Sampling detected VOCs above MCLs in five private wells south of the landfill, which have all been connected to town water. The RI/FS assessment indicated that the contaminants of concern were detected at the highest concentrations at the source area, and were decreasing in concentration with distance from the landfill as a result of diffusion and natural degradation processes.

Surface Water, Sediments, and air

Some metals and low levels of 1,2-DCE and TCE were detected in surface water samples from the unnamed stream that runs along the eastern side of the landfill. Sediment samples from the unnamed stream also contained metals. VOCs and

SVOCs were detected infrequently and at low concentrations. The highest contaminant concentrations found in sediments were detected in the areas adjacent to the SWDA in the northeast portion of the Site. No VOCs or SVOCs were detected at elevated levels in sediment samples collected from the Passumpsic River. During two rounds of air quality monitoring conducted during the RI, only slightly elevated levels of VOCs were detected at the landfill.

Site Risks and Cleanup Objectives

A human health and environmental risk assessment for the Site was completed in May 1993. It was determined that there was an unacceptable risk to future residents who may consume contaminated groundwater. Adverse health effects would be due primarily to the presence of TCE, vinyl chloride and arsenic. Residents in these future new homes might also experience adverse health effects if they were exposed to contaminants in IWS area soils and the unnamed stream sediments immediately adjacent to the SWDA on a daily basis for several years. No adverse health effects were expected as a result of contact with the waters from the Passumpsic River or unnamed stream, or as a result of breathing air at the landfill.

The ecological risk assessment indicated the local habitat had been significantly affected due to soil erosion and silt deposit from the SWDA and the IWS areas. Additionally, animals could be affected by the metal contamination detected in surface soils in the IWS area through ingestion of plants and insects.

Based on the calculated risks, EPA identified the following objectives for the Site cleanup:

* To prevent direct exposures to soil and solid waste in the SWDA and IWS areas;
* To minimize the movement of contamination in the SWDA and IWS areas into groundwater, surface water and sediment;
* To prevent ingestion of groundwater which may pose a risk to human health;
* To comply with Federal and State Applicable or Relevant and Appropriate Requirements (ARARs); and
* To address the potential risks, site-specific cleanup levels were established for groundwater at the Site. The point of compliance for attaining the cleanup goals was identified as the vertical surface located at the hydraulically downgradient limit of the landfill, that extends in the overburden groundwater to bedrock. A complete description and list of the cleanup goals can be found in Section X.A, page 37 and 38 of the April 1995 ROD (attached).

II. RECORD OF DECISION (ROD) and EXPLANATION OF SIGNIFICANT DIFFERENCE

The April 1995 ROD set forth the selected remedy for the entire Site which involved the construction of a low permeability cap over the consolidated wastes at the landfill, pump and treat of contaminated groundwater to reduce contaminant levels to safe drinking water levels at the landfill perimeter, long-term monitoring of river sediments and ground water, connection of all private residences within the plume buffer zone to the public water supply, and institutional controls to prevent any future ground water consumption and excavation of waste in the landfill area. The selected remedy is one operable unit and is a comprehensive approach for this Site which addresses all current and potential future risks caused by the principal threat Site wastes which are the indicator groundwater contaminants/cleanup levels (attached as page 37 and 38 of the ROD).

A. Landfill Cap

The portion of the remedy which addressed the construction of the landfill cap, included the primary components (as further detailed in Section X of the ROD and are illustrated in Figure 2):

1) Construction and maintenance of multi-layer caps which meet the performance standards of a RCRA Subtitle C cap on the SWDA and the three IWS areas;
2) Installation and operation of a landfill gas management system that meet the ARARs identified in the ROD. An active collection and treatment system to be installed in IWS2. Appropriate gas management systems for the SWDA, IWS1 and IWS3 areas;
3) Restoration of wetlands areas impacted by the cap, on-site;
4) Implementation of institutional controls to protect the capped areas; and
5) Collection of data for the Five Year Site Reviews to assure that the cap remedy continues to protect human health and the environment.

B. Groundwater Remediation

As a result of a post-ROD groundwater sampling program, a July 2004 ESD was signed to change the groundwater remedy from pump and treat to a dual-phased approach to address groundwater contamination at the source area adjacent to the cap and in the downgradient area of the plume. The primary components of the groundwater remediation implemented at the Site include:

1) Construction of a Permeable Reactive Barrier (PRB) to intercept and treat groundwater impacted by VOCs through induced, in-situ reductive dechlorination processes (see figure 3);
2) Locating the PRB across (perpendicular to the direction of flow) the source portion of the plume adjacent to the eastern edge of the landfill;
3) In-situ bio-enhanced attenuation (BNA) through injection of a reagent (e.g., a source of carbon) at a highly impacted area of the groundwater plume downgradient of the PRB;
4) Monitoring the effectiveness of the attenuation processes outside of the PRB and bio-enhancement/injection areas through groundwater sampling for VOC, transformation products (i.e., ethane, ethene, volatile fatty acids) and geo-chemical parameters (i.e., pH and redox potential);
5) Long-term monitoring of groundwater, surface water and sediments to document and evaluate the effectiveness of the remedial alternative and to evaluate potential impacts to the Passumpsic River;
6) Five year reviews to evaluate the progress of the remedial action in achieving the remedial action objectives specified in the ROD, including protection of human health and the environment; and
7) Creation of wetlands on-Site to compensate for wetlands destroyed through the construction of the PRB.

In summary the studies performed in support of the ESD indicated that there are favorable conditions at the Site for the combined remedial action of the PRB in the source area and the BNA in the downgradient area to attain the remedial action objectives. This combination of technologies was determined to be the preferred source control alternatives over pump and treat for several reasons. At the source, the PRB will work as a reactive barrier to intersect the most concentrated portion of the source area plume (from the water table to bedrock). This in combination with the downgradient BNA technology will destroy VOCs in-situ with significantly improved near term results, and without the need for significant equipment/facilities that an ex-situ pump and treat operation would require. Additionally, the costs are significantly less, due primarily to very low operation and maintenance (O&M) requirements. While the cleanup time estimates are very difficult to predict with both the constructed alternatives and that of pump and treat, current information and analysis indicate that the constructed remedial technology can attain cleanup goals within a 30 year period. The estimate for attaining cleanup goals using the pump and treat alternative was approximately twice as long. The constructed remedial alternative is expected to remain effectively in place without the reliance of operators and equipment that would be necessary for the operation of a pump and treat system. It was determined that the constructed alternative will provide the most favorable combination of short/long-term effectiveness, implementability, reduction in toxicity/mobility/volume, and cost effectiveness.

III CONSTRUCTION ACTIVITIES

Landfill Cap Implementation

Construction of the cap began in April 1999 and was completed in December 2001. The design components of the cap were set forth in the Landfill Cap Remedial Design Statement of Work dated November 1996. Industrial wastes and contaminated soils were excavated from one of three separate IWS areas (#2) in June 1999 and placed into the SWDA area prior to capping; eliminating the need for a separate cap over this area. A continuous multi-layer cap was constructed over the SWDA and one of the other IWS areas (#1) between May 1999 and October 2000. A separate multi-layer cap was constructed over the last IWS area (#-3). A landfill gas management system was constructed to control gas generated in the landfill. The active gas management system consists of 17 gas extraction wells, piping and blowers, and an enclosed flare to destroy VOCs and methane.

Below is a detailed list of the landfill construction activities performed:

1. development, implementation, and maintenance of a site-specific health and safety plan;
2. provision and maintenance of temporary facilities and controls;
3. installation and maintenance of surface water and erosion controls;
4. clearing and grubbing of work areas;
5. excavation, re-grading, and consolidation of refuse materials in and around the landfill (including IWS 1, IWS 2, and the bottle and debris burning area;
6. abandonment of monitoring wells;
7. re-grading the SWDA prior to cap construction;
8. construction of a multi-layer double barrier cap on SWDA and IWS 3 [except items b) and i)] consisting of the following layers:
    a) 6-inch thick subgrade soil layer;
    b) 12-inch thick bottom low hydraulic conductivity layer (on slopes greater than seven percent horizontical/vertical (H:V));
    c) geosynthetic clay liner barrier layer (on slopes less than seven percent H:V);
    d) 60 mil textured linear low density polyethylene flexible membrane liner;
    e) geo-composite drainage layer; and a
    f) 12 inch thick protective cover soil layer;

- g) 24 inch thick vegetative support soil layer;
- h) 6 inch thick topsoil layer; and
- i) drainage benches, gabion-lined downcomers, rip-rap-lined plunge pool, and lined ditches.

9. construction of a landfill gas system including:
   - a) 17 vertical extraction wells with 8-inch-diameter screen and riser and well head components;
   - b) 6-inch-diameter high-density polyethylene gas collection piping and control values and appurtenances;
   - c) condensate collection system, including a 10,000 gallon underground storage tank, transfer, and control equipment;
   - d) a blower and flare with condensate injection;
   - e) a control building; and
   - f) gas monitoring probes.
10. construction of lined drainage swales and installation of culverts;
11. installation of drainage structures at toe of cap;
12. fertilization and seeding of the topsoil layers;
13. installation of perimeter fencing and access gates;
14. mitigation of wetland impacts; and
15. Demobilization and closeout.

Institutional controls to restrict groundwater use at the Site and to restrict use of the cap and groundwater treatment areas have been defined and partially implemented; however, there are no current site uses that would violate the proposed institutional controls. A land use easement with the Site owner has been drafted and will be finalized in 2006. The landfill has performed well since constructed. Details of the cap are presented in the Remedial Action Report for the Landfill Cap Remedy dated July 2001 and the updated Remedial Action Report dated July 2002 (author, Ethan Allen, Inc.). All punch list items identified in the Final Site inspection for the cap have been completed with the exception of installation of the final 2-3 landfill gas monitoring probes which will be completed in the area of the trailer park by EPA in 2007.

The approximate extent of the in-place cap is shown in Figure 2.

Groundwater Remedy Implementation

PRB

The "Draft Source Area Pre-Design Technical Report" dated January 9, 2004, evaluated the feasibility of a zero-valent iron PRB wall to passively intercept the upgradient portion of the VOC-contaminated plume, and to effectively reduce concentrations of chlorinated VOCs in groundwater at the source area. This report concluded, based on column testing and bench-scale studies, that a zero-valent iron PRB would be effective in reducing concentrations of chlorinated VOCs to below the groundwater cleanup goals at the Site.

The PRB was installed using an open trench technique with excavation by an extended-arm backhoe, using a bio-polymer slurry for support (guar gum). The trench was backfilled with a granular iron/sand blend. The trench is approximately 2.5 feet in width and approximately 235 feet in length. The trench depth is approximately 62 feet below ground surface (bgs), decreasing linearly to approximately 30 feet bgs on the eastern end. The PRB is comprised of four different iron/sand blends. The iron percentage by weight is 34.5 percent, 61.2 percent, 100 percent and 51.3 percent in four different zones.

A total of eight monitoring wells, in three well clusters were installed within the trench during construction. Each cluster was bound together with nylon ties surrounding a section of reinforced steel bar and suspended in the excavation as the trench was backfilled with the iron/sand blend. These wells are 1-inch diameter and constructed using a 10-foot polyvinyl chloride (PVC) screen and riser. In addition, 21 monitoring wells in eight clusters were installed at strategic locations around the PRB perimeter. All wells were tested during construction to assess groundwater quality and geochemistry. The initial testing indicates that VOC concentrations have reduced and that there is an elevated concentration of ethene/ethane. As designed, a reactive zone has been established and de-chlorination is occurring. O&M is currently being performed by the PRPs. The location of the constructed PRB is shown in Figure 3.

The PRB technology uses a reactive media of granular zero-valent iron to treat chlorinated VOCs in groundwater by permanently reducing the volume and toxicity of the contaminants through reductive de-halogenation, as electrons transfer from the iron to halogenated VOCs at the iron surface contact point. The result is halogen ions being replaced by hydrogen species that yield the non-halogenated compounds ethene or ethane. These, in turn, are mineralized by bio-degradation in the groundwater downgradient of the PRB treatment cell. Pre-design field and bench scale testing confirmed that Site conditions were favorable for the successful implementation of the PRB technology, and that it is estimated to be a suitable and effective remedial action for facilitating groundwater restoration .

The physical extent of the PRB cell constructed to intercept contaminated groundwater is noted above. The cell was constructed adjacent to the south-eastern edge of the landfill using trenching technologies. In order to construct the PRB, the following activities occured: 1) relocation of power line; 2) up-grade of an access road; 3) abandonment of select groundwater monitoring wells; 4) extension of an existing stream culvert; 5) re-grading of the area where the PRB was located (including erosion and sediment control measures, seeding); and 6) construction of a gravel work pad and guide wall.

The granular iron was blended with sand to create the reactive media backfill made of approximately 26% iron (sufficient percentage based on pre-design investigation results). This material was placed in the trench continuously using a tremie pipe to an elevation of two feet above the high groundwater table, and was backfilled with sand. In order to adequately monitor the performance of the PRB and to reduce contaminant concentrations in the groundwater, additional monitoring well clusters were installed (Figure 3).

BNA

Construction of the bio-enhanced natural attenuation technology included limited modification of the terrain in the downgradient area to improve access to install a series of injection/extraction wells. Area preparation included limited clearing of trees and brush, construction of an access road, and the extension of an electrical power line from Lily Pond Road. The wells installed span a distance of approximately 500 feet and are located 40 feet apart (see figure 4). To meet the cleanup objectives, groundwater is being withdrawn from the extraction wells and amended using the sodium lactate/nutrient solution and re-injected back into the overburden groundwater via injection wells. Based on the pre-design test results this solution contain: 60% sodium lactate; ammonium bromide; ammonium carbonate; and ammonium phosphate. EPA retains the ability to modify this solution to improve its effectiveness. As with the PRB technology a post implementation monitoring program is ongoing to track the induced effects within the groundwater system. This includes quantifying geochemical field parameters that contribute to, or are indicators of, the degradation of the chlorinated organic contaminants.

Wetlands

The PRB work pad construction required removing approximately 0.26 acres of wetland, as characterized in a Wetland Investigation Summary letter submitted to WPA on October 29, 2004. A compensatory wetland was constructed along the west side of the unnamed stream approximately 1,550 feet downstream from the PRB. This location is within the 50-foot-wide conservation easement located adjacent to the unnamed stream and was selected based on guidance from EPA, the U.S. Fish and Wildlife Service and the VTDEC.

A design plan for the compensatory wetland was prepared by URS and submitted for review and comment by the EPA and the VTDEC on August 17, 2005. Based on both federal and state comments, URS revised the plan and resubmitted it on August 18, 2005. EPA approved the design on August 19, 2005. The compensatory wetland is 0.44 acres in size. This ratio was approved by EPA and the VTDEC based on the designated space available within the conservation easement area. With this approval, the wetland requirements are achieved.

Wetland construction commenced on August 23, 2005. The shaping, grading and seeding of the wetland was performed by URS under the direction of the EPA. An existing log pile was relocated to an area located beyond the conservation easement area. Excess soil from the wetland construction area was stockpiled for reuse by the property owner in an area outside of the conservation easement property. This work was completed on August 29, 2005.

Two approved modifications were made to the topography of the wetland because of higher than anticipated groundwater levels within the constructed wetland area. The first was raising the central basin from a design bottom elevation of 704.5 feet to approximately an elevation of 706 feet, and raising the upstream basin from an elevation of 405.5 feet to an elevation of 406 feet. The second modification was to not make a lower upstream entrance to the wetland due to the presence of an active beaver dam in the stream adjacent to the wetland. The elevated in-channel water levels resulting from the beaver dams could re-route the stream into and through the constructed wetland via the upstream wetland inlet, resulting in damage to, and loss of, the intended function of the wetland. It was determined by EPA and the VTDEC that no further excavation was warranted.

Wetland shrubs were planted on September 13, 2005 by URS. The placement of willow stems was performed on December 2, 2005 to correspond to the period of plant dormancy required for planting. Disturbed areas adjacent to the wetland and the soil stockpile were hydro seeded by Trans-America Hydro-Seeding on September 20, 2005.

IV CHRONOLOGY OF EVENTS

Below is a general chronology of events for the remedial action. Detailed chronology of remedial construction activities for both the construction of the landfill cap, groundwater remediation and wetlands creation are provided in Tables 3.1, 4.1, and pages 36 and 37 attached (12/90/2005 URS RA report).

1999	EPA enters into a Consent Decree with the performing settling defendants to implement certain remedial action outlined in the 1995 ROD.
1999	EPA issues and Administrative Order to Vermont American Corporation to address groundwater remedial action.
1999-2002	RCRA C compliant composite barrier landfill caps,surface water drainage controls and gas management systems are constructed over the SWDA, IWS 1, and IWS 2 areas by contractors to parties of the CD. The final Remedial Action Report for the landfill was completed in July of 2002.
2000-2004	Collection of post-cap groundwater data by Vermont American Corporation.
July 2004	Explanation of Significant Differences for groundwater were issued by EPA addressing groundwater remedial measures to be implemented pursuant to the ROD objectives.
September 2004	Draft 100 % Remedial Design submitted addressing groundwater remedial actions. This submission provided the design parameters and associated documentation for implementation of the BNA and PRB remedial actions.
September 2004	Construction activities associated with the BNA and PRB groundwater remedial actions began.
April 2005	Draft Supplemental Characterization Report and Revised Design Submission Downgradient Bio-enhanced Natural Attenuation Remedial Action was submitted presenting an assessment of hydrogeologic data collected from injection and extraction wells installed during the Fall 2004 field program and the associated design modifications to the BNA system.
September 2005	Construction completion of the landfill, BNA, PRB groundwater remedial action, and Preliminary Construction Completion Report was signed.
May 2006	Final Inspection performed and the Site is determined to be Operational and Functional.

V PERFORMANCE STANDARDS AND CONSTRUCTION QUALITY CONTROL

Activities to implement the Remedial Action were consistent with the ROD, the CD, the UAO and associated scopes of work (SOWs) and work plans. EPA provided oversight of the project with assistance from Metcalf & Eddy. VTDEP also provided oversight. In addition, in accordance with the CD and UAO, Harding Lawson and URS Consultants served as the Independent Quality Assurance Team (IQAT) contractors. The IQAT teams performed the following functions:

a) Conducted quality assurance assessments;
b) Verified that the Construction Quality Assurance Plan (CQA Plan) was implemented;
c) Performed independent on-site observations of the work to assess conformance with project standards;
d) Reported to the Performing Settling Defendants, EPA and VTDEP the results of observations and testing; and
e) Prepared the Final Remedial Construction Reports

Harding Lawson performed the IQAT activities associated with documenting all activities associated with the design and construction with the landfill cap. Fred Taylor was the IQAT professional for the remedial construction activities at the landfill, as certified on July 16 2001 after Harding demobilized from the Site. David Andrews and Jason Clere from URS Corporation performed the construction quality activities associated with the groundwater remediation (dated December 9, 2005).

The IQAT for the cap and the construction quality for the groundwater activities provided a thorough, consistent evaluation of construction activities and materials, comparing activities and materials to the project specifications and performance standards. IQAT observations and test results were collected on forms and checklists on a daily basis. The IQAT and groundwater quality assurance activities provided constant feedback to the General Contractors, the Settling Defendants and EPA regarding construction progress and whether any issues existed. Situations of non-conformance with project specifications, were raised early, and with appropriate documentation and reference to project specifications. In most cases this allowed for quick resolution of all issues(either acceptance of the non-conformance or re-constructing to attain conformance). In general, project specifications and performance standards were met during construction. Deviations from specifications were well documented. When deviations were accepted by EPA, they were considered to be minor in nature and insufficient to affect the performance of the remedy. Throughout construction of both the landfill and groundwater remediation, EPA, their consultants (Metcalf & Eddy), and the VTDEC performed regular field oversight of the PRPs and their construction contractors.

Following installation of the monitoring wells necessary to complete the groundwater monitoring network, quarterly monitoring of groundwater commenced. As expected, downgradient wells exceeded cleanup requirements for some contaminants. Sampling and analysis are being conducted in accordance with the approved Quality Assurance Project Plan (QAPP) and are accompanied by the necessary documentation. Data quality has met the project requirements.

The "Final Remedial Construction Reports contain a compilation of all data, test results and field observations and documentation necessary to document that the implementation of the remedy is in conformance with the ROD, the RD's, and the project specifications.

The ESD estimate for achieving the groundwater interim remedial cleanup levels is 30 years.

VI PRE-FINAL INSPECTION

The pre-final Inspection for the landfill was conducted on June 20, 2001. The pre-final inspection for the groundwater and wetlands was conducted on September 29, 2005. Attached are the punch list items for both portions of the site. All punch list items were adequately performed.

Health and safety requirements appear to have been adhered to throughout the project. A health and safety meeting was conducted each morning for both the landfill and groundwater remediations. Sign-in/sign-out sheets were maintained and open work areas were flagged. No injuries were reported during the project. Prior to the start of both constructions, project personnel met with local public safety officials regarding acceptable truck routes to access the Site. The general contractors maintained strict discipline with drivers transporting materials and equipment to and from the site. Required routes were utilized, trucks were cleaned upon leaving the site and the public roads outside the site were cleaned on a regular basis.

Institutional Controls

The ROD required institutional controls be put in placed to restrict the use of groundwater. The three primary components included; 1) water line installation and residential hook-ups; 2) restrictions of future/current groundwater use; and 3) groundwater reclassification. These restrictions affected 17 parcels at and adjacent to the Site. Currently all homes within the restricted area have been connected to the Lyndonville public water supply and their former private wells were abandoned. The

groundwater was re-classified by the VTDEC from Class III to Class IV on 260 acres in April of 2005. Seven of the 17 parcels currently have groundwater easements recorded with the town of Lyndonville. Six of the remaining parcels are owned by the Site owner (the "Parkers") and an agreement in principle was reached with the Site owner, EPA and the VTDEC in April of 2006. Those six easement are expected to be recorded in 2007.
The remaining four parcel owners are non-complaint. The PRPs, EPA and the VTDEC are currently working with these parcel owners to record their easements to restrict future groundwater use. Completion of this task is anticipated in 2008.

VII OPERATION & MAINTENANCE ACTIVITIES

Operation and maintenance (O&M) activities will be similar to other landfills and groundwater treatment systems in many ways. Periodic scheduled inspections will be conducted, utilizing checklists to ensure completeness of inspections and documentation of findings as well as to document any necessary corrective actions. Corrective actions will be performed by the Settling Defendants who have responsibility for O&M indefinitely. Components of the remedy covered by inspections include:

- Landfill cap and vegetation;
- Storm water drainage structures (swales, berms, downchutes);
- Gas collection and treatment and associated piping and valves;
- Continued sampling and operation of the BNA and PRB;
- Fence and gates; and
- Wetlands.

Groundwater monitoring at both the landfill and groundwater remediation area will be conducted on a semi-annual basis with analytical results reported to EPA and VTDEP. The Settling Defendants have the responsibility for groundwater monitoring until the cleanup standards are met.

VIII SUMMARY OF PROJECT COSTS

The ROD 30 year present worth cost for the total response action consisted of $15,450,000 in Capital expenses and $12,710,000 in O&M expenses, for a total of $28,200,000. The estimated 30 year present worth costs associated with the landfill and institutional control component of the remedy was $11,600,000 in capital expenses and $2,010,000 in O&M expenses, for a total of $13,600,000. The final cost for the landfill portion of the remedy was $5,700,000.

The revised ESD estimate to construct and operate the PRB and BNA groundwater treatment systems was approximately $10,779,000, which included $5,276,000 in capital costs and $5,503,000 in O&M costs. The final cost for implementation was $4,060,000.

EPA's oversight cost for the landfill cap portion of the site was $362,095.61. EPA's oversight costs for the groundwater remediation was $823,521.83. The PRPs for both portions of the remedy have been paid in full to EPA.

IX OBSERVATIONS AND LESSONS LEARNED

Landfill Cap

A summary of the observations and lessons learned from the landfill remedial actions is provided below:

1. A sufficient number of qualified QC personnel must be on site during the majority of RC activities:
2. Comprehensive stormwater management and E&S controls must be implemented during landfill construction activities, and should not allow large areas of highly erodible soils to be concurrently exposed:
3. Construction schedules should provide for storm water management and erosion and sediment controls to be implemented to the extent feasible and practicable, prior to extensive earthworks/soil exposure:
4. It is critical to establish site survey control for all slopes relative to RD specified requirements at the beginning of remedial construction activities:
5. Construction schedules should allow for additional excavation time if contaminated soils are being excavated and the extent of contamination is not fully defined:
6. Potential problems with materials not meeting specifications and the format and requirements for compilation/presentation of QC manufacturer's information should be considered prior to material use:
7. The presence of active on-site construction management during remedial construction earthworks activities is critical to provide adequate subcontractor oversight:
8. Scheduling and delivery of materials should be conducted, to the extent practicable, prior to beginning remedial activities:
9. Construction activities on steep slopes and associated erosion and sediment controls adjacent to wetlands/surface water should be carefully planned: and
10. It is critical to have and approved construction quality assurance plan completed

prior to significant construction activities.

The following sections provide selected observations and lessons learned from the groundwater remedial construction activities performed at the site.

PRB-Reactive media mixing

There are several methods which can be used to blend granular iron and sand prior to placement in the trench. The method employed for the PRB installation is referred to as the weight-based ratio method where a ready-mix concrete truck containing a pre-weighted amount of sand was brought to the PRB site and a calculated number of sacks of iron was added and then mixed to achieve the required iron-sand ration. This method was reported by others to be an accurate and efficient method. The contractor's experience, URS Corporation, for the PRB construction supported this observation. They were able to confirm that all the blended reactive media placed in the PRB met the specifications through the batch plant loading tickets and iron sack tag documentation. Also, the method provided assurance that a complete mixing of the media was achieved by prescribing a minimum number of rotations (i.e. 100) that could be checked by the concrete drum counter. Additionally the allowable holding time for the media was accurately tracked using the moisture content measured by the batch plant for each load of sand.

PRB-Curvilinear Trench

The PRB trench was designed as a 235 foot long gentle curve. In actuality, the PRB was constructed as a series of straight-line segments because it was not possible to excavate a true curve with the long-boom backhoe. Although this did not in any way impact the functionality of the PRB, it did require the placement of reactive media volumes greater than the quantity estimated from the neat line of the design. For material quantity estimating purposes it would have been more practical to incorporate the linear segmentation required for construction into the design to more accurately estimate the amount of granular iron required for placement.

PRB-Trench Edge

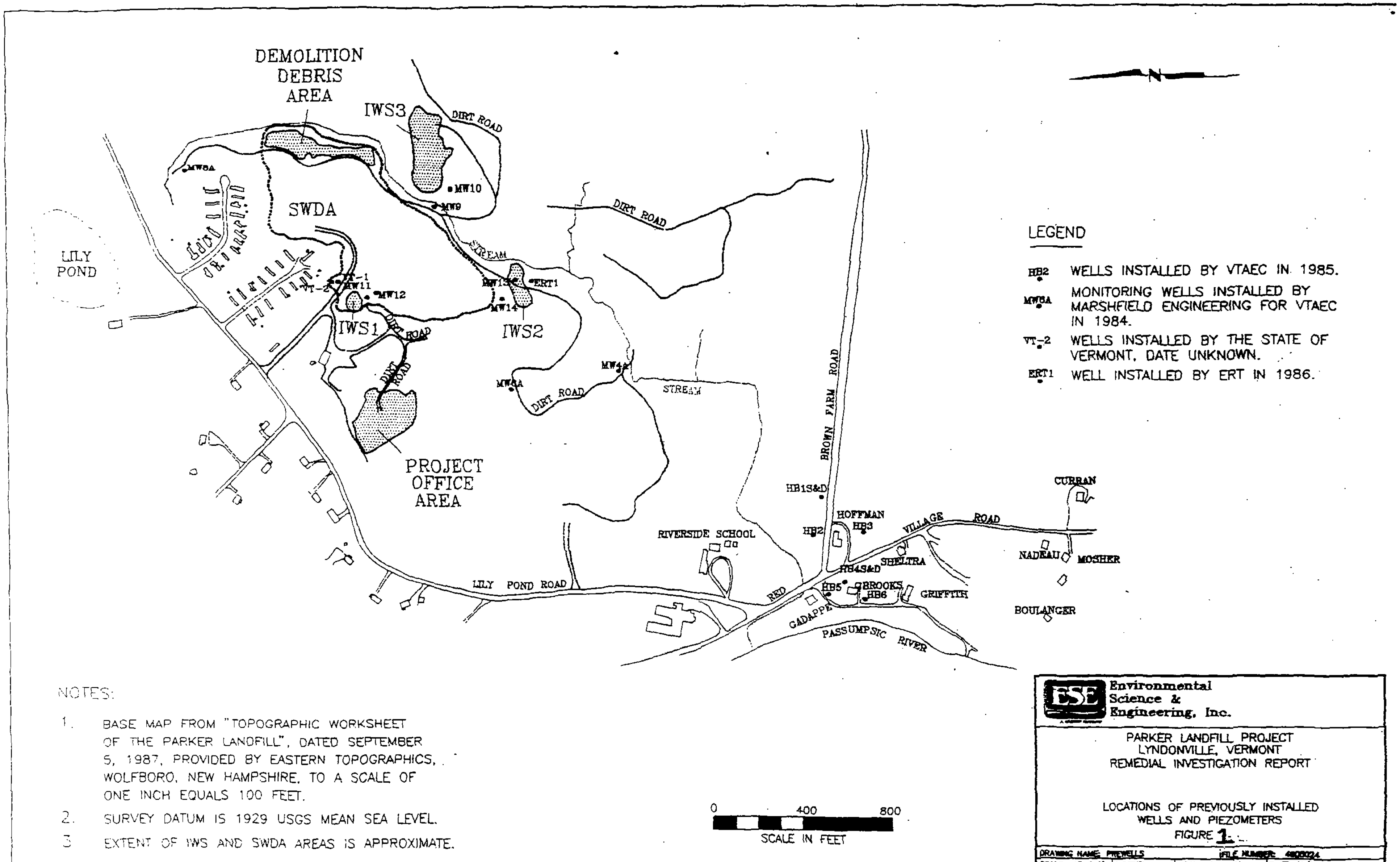
A number of engineers interviewed during the design process had experienced problems at other locations with sloughing failures of the upper sidewall trench edge during construction. These failures resulted in problems such as contamination of the backfill media with soil, over widening of the trench and increased construction difficulty due to the wider top aperture. Recognizing this problem and the fact the PRB area soils were silty fine sands likely to be unstable when wet, URS designed a guide wall system to provide a hardened edge for the PRB using geosynthetic reinforcing grid layers, wire face baskets, and granular backfill. This hardened edge performed as designed and prevented failure of the PRB side walls. As an added benefit, the reinforcing greatly improved the performance of the sub-grade.

PRB-In-Wall Monitoring Wells Installation

Monitoring of the PRB performance necessitated the installation of in-wall monitoring wells, and three clusters of in-wall wells were included in the design. Installation of on-wall wells using conventional drilling methods can be difficult due to the narrow and deep installation, and because of difficulties in installing vertically-plum wells in non-native fill materials using traditional drilling methods. For the PRB, the in-wall monitoring wells were pre-assembled (en-caps, screens, and risers) and placed into the excavated trench prior to media backfill. Each cluster consisted of 1-inch diameter PVC well screens and risers bundled using cable ties to either a 1.5-inch diameter rebar or a 2-inch diameter steel pipe fitted with steel plate fins for additional stability during backfilling. The monitoring wells bundles were lifted by crane and set in place within the excavated trench prior to media backfill. The well construction met the specifications and the wells functioned normally following installation. It is URS' belief that this is the first successful use of this pre-placement installation method.

X SITE CONTACT INFORMATION

Name	Affiliation and information
Leslie McVickar Ed Hathaway	EPA RPM (groundwater) 617-918-1374 EPA RPM (landfill) 617-918-1372
John Schmeltzer	VTDEP - Project Manager 802-241-3886
Neil Thurber	Proj. Mgr, Metcalf & Eddy - Oversight Contractor 781-224-6352
Jason Clere	Proj. Mgr. For GW URS Corp. 207-879-7686
Paul Kaminski	Landfill Project Coordinator, Ethan Allen Corp.203-743-8540
Oliver Wesley	Proj. Mgr., Harding Lawson - General Contractor 207-775-5401



NOTES:

1. BASE MAP FROM "TOPOGRAPHIC WORKSHEET OF THE PARKER LANDFILL", DATED SEPTEMBER 5, 1987, PROVIDED BY EASTERN TOPOGRAPHICS, WOLFBORO, NEW HAMPSHIRE, TO A SCALE OF ONE INCH EQUALS 100 FEET.
2. SURVEY DATUM IS 1929 USGS MEAN SEA LEVEL.
3. EXTENT OF IWS AND SWDA AREAS IS APPROXIMATE.

ESE Environmental Science & Engineering, Inc.

PARKER LANDFILL PROJECT
LYNDONVILLE, VERMONT
REMEDIAL INVESTIGATION REPORT

LOCATIONS OF PREVIOUSLY INSTALLED WELLS AND PIEZOMETERS
FIGURE 1

DRAWING NAME: PREWELLS		FILE NUMBER: 4808024	
SCALE: 1"=500'	REVISION: 0	DRAWN BY: PLM	DATE: 11/12/92

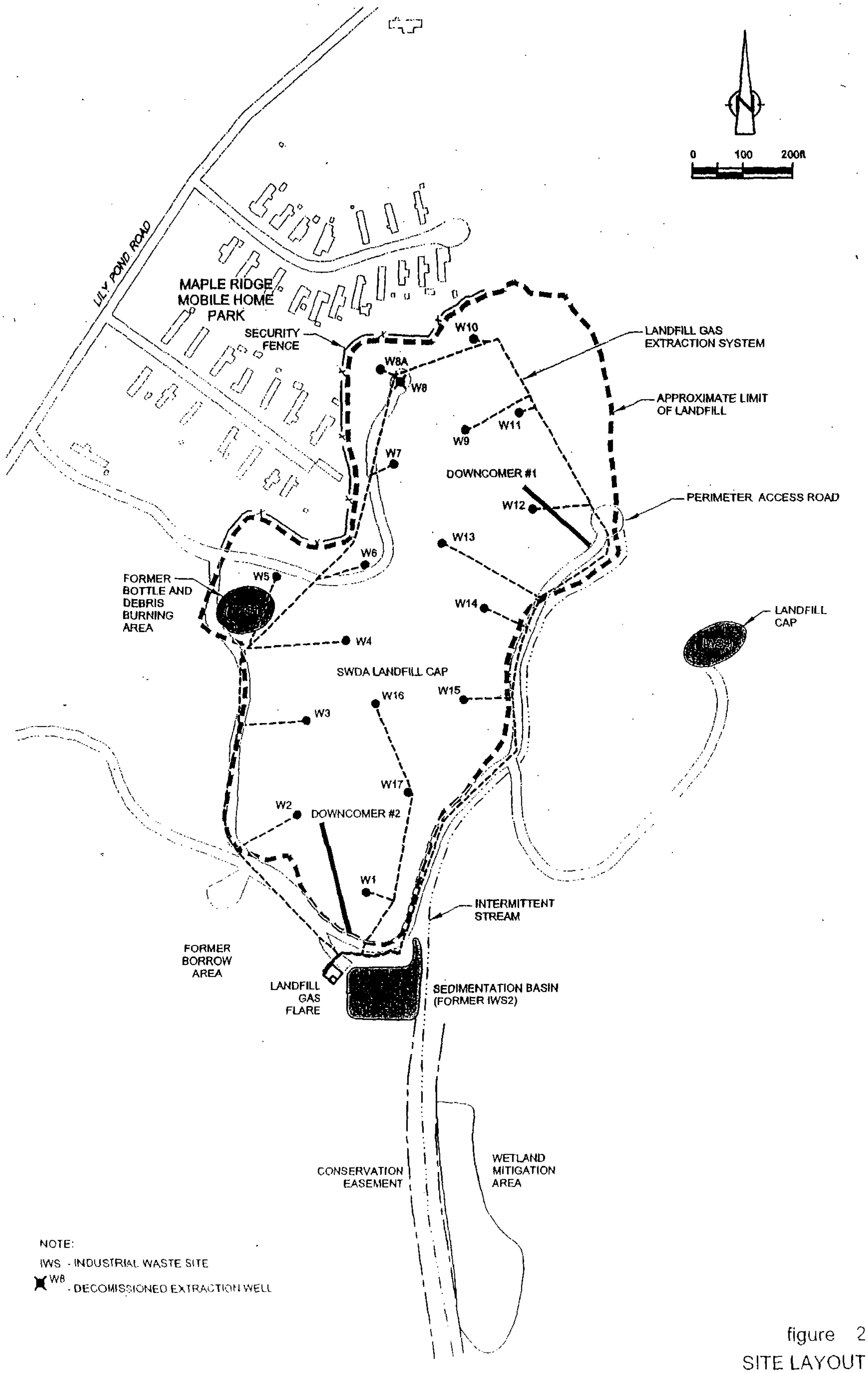


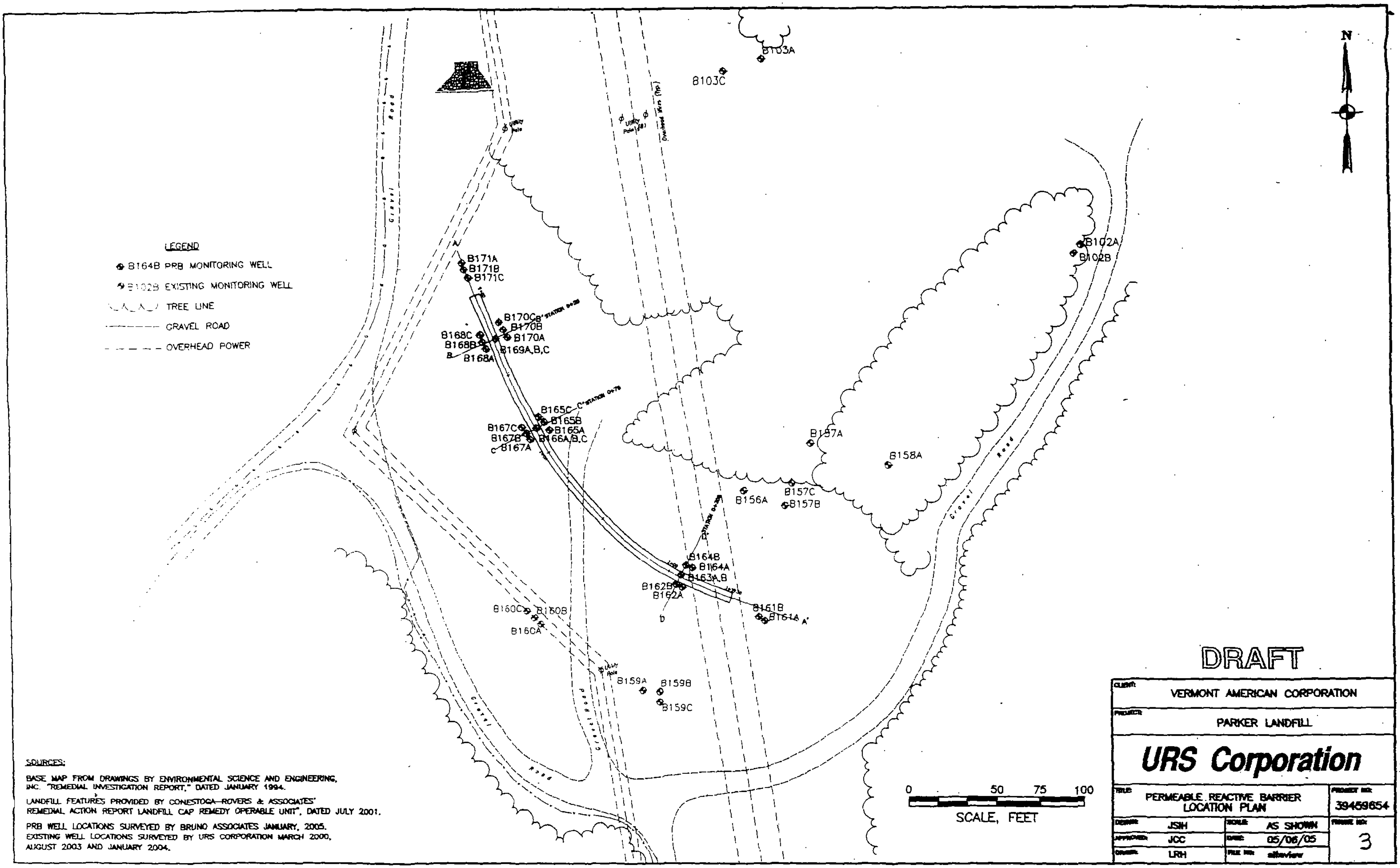
figure 2

SITE LAYOUT

PARKER LANDFILL SUPERFUND SITE

Lyndonville, Vermont - Ethan Allen, Inc.

14199-42(005)GN-WA006 JUL 05/2001


LEGEND
B164B PRB MONITORING WELL
B102B EXISTING MONITORING WELL
TREE LINE
GRAVEL ROAD
OVERHEAD POWER
B103A
B103C
B102A
B102B
B171A
B171B
B171C
B170C
B170B
B170A
B169A,B,C
B168C
B168B
B168A
B165C
B165B
B165A
B166A,B,C
B167C
B167B
B167A
B157A
B158A
B156A
B157C
B157B
B164B
B164A
B163A,B
B162B
B162A
B161B
B161A
B160C
B160B
B160A
B159A
B159B
B159C
Gravel Road
N
DRAFT
SOURCES:
BASE MAP FROM DRAWINGS BY ENVIRONMENTAL SCIENCE AND ENGINEERING, INC. "REMEDIAL INVESTIGATION REPORT," DATED JANUARY 1994.
LANDFILL FEATURES PROVIDED BY CONESTOGA-ROVERS & ASSOCIATES' REMEDIAL ACTION REPORT LANDFILL CAP REMEDY OPERABLE UNIT", DATED JULY 2001.
PRB WELL LOCATIONS SURVEYED BY BRUNO ASSOCIATES JANUARY, 2005.
EXISTING WELL LOCATIONS SURVEYED BY URS CORPORATION MARCH 2000, AUGUST 2003 AND JANUARY 2004.
0
50
75
100
SCALE, FEET
CLIENT: VERMONT AMERICAN CORPORATION
PROJECT: PARKER LANDFILL
URS Corporation
TITLE: PERMEABLE REACTIVE BARRIER LOCATION PLAN
PROJECT NO: 39459654
DESIGN: JSH
SCALE: AS SHOWN
FIGURE NO: 3
APPROVED: JCC
DATE: 05/06/05
DRAWN: LRH
FILE NO: siteview

LEGEND

(EW-5)WELL A — EXTRACTION WELL (FORMER IDENTIFICATION NUMBER IN PARENTHESES)

(IW-5)WELL 9 — INJECTION LOCATION (FORMER IDENTIFICATION NUMBER IN PARENTHESES)

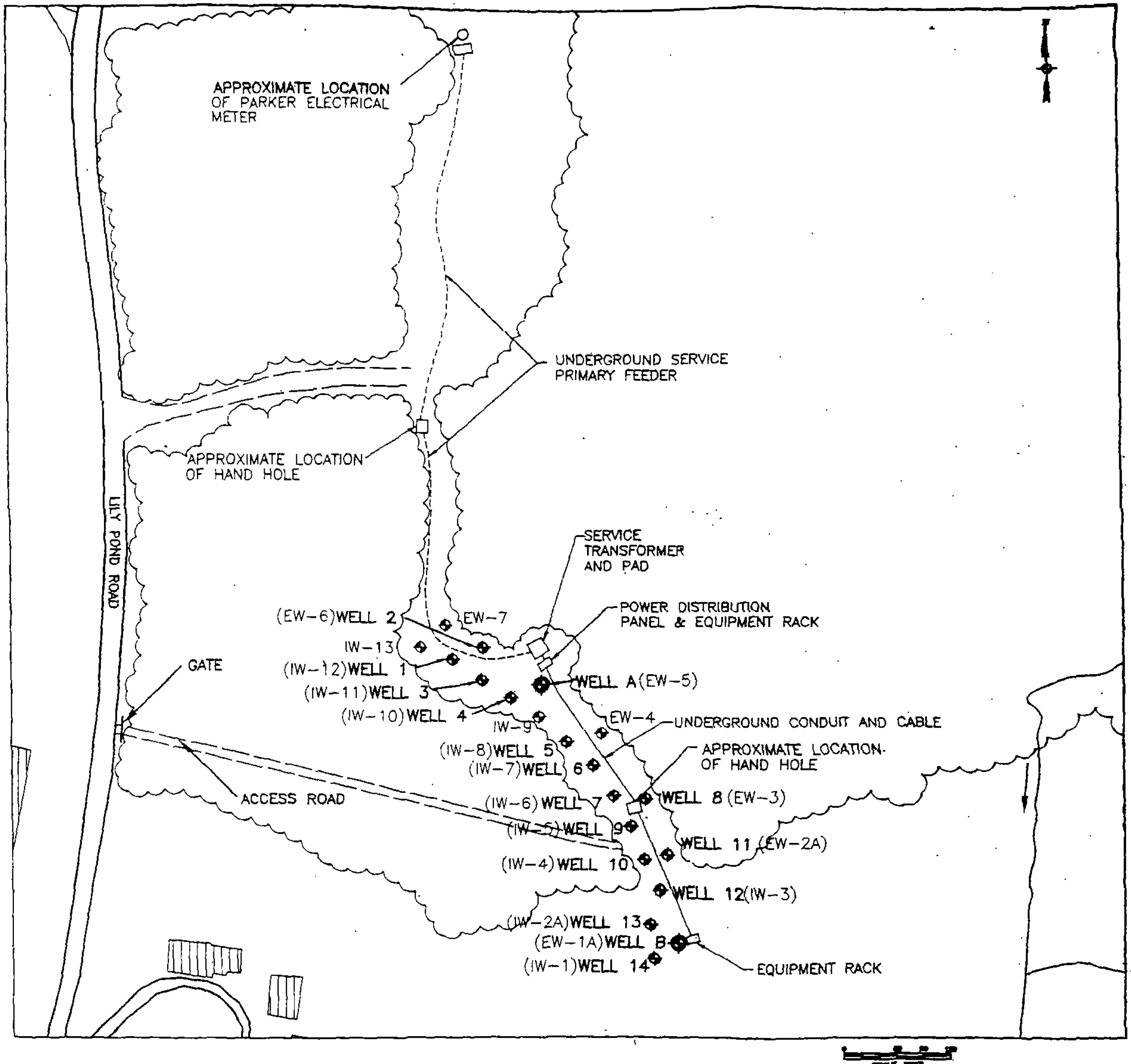
IW-9 — NON-INJECTION LOCATION

UNIMPROVED ROAD

ROAD

BUILDING

TREE LINE



REV	DATE	DESCRIPTION	ISSUED FOR:	DATE:		
			PRELIMINARY		DRAWN:	
			APPROVAL		CHECKED:	
			CONSTRUCTION		APPROVED:	

URS

URS Corporation
115 Water Street, Suite 3
Hallowell, ME 04347
Tel: 207.623.9188
Fax: 207.622.6065
www.urscorp.com

PROJECT NAME:	BIO-ENHANCED NATURAL ATTENUATION SYSTEM O&M
PROJECT LOCATION:	PARKER LANDFILL, LYNDON, VERMONT
CLIENT:	VERMONT AMERICAN CORPORATION
PROJECT NO.:	FILE NO.: WELL LOCATIONS.DWG

SHEET TITLE: EXISTING SITE CONDITIONS

SHEET 1 OF 1

DRAWING NO.: 4

TABLE I: INTERIM GROUNDWATER CLEANUP LEVELS

Carcinogenic Contaminants of Concern (class)	Interim Cleanup Level (ug/l)	Basis	Level of Risk
1,1-Dichloroethene(C)	7	MCLG	$5x10^{-5}$
Benzene(A)	5	MCL	$1.7x10^{-6}$
Methylene Chloride(B2)	5	MCL	$4.5x10^{-7}$
Tetrachloroethane(B2)	0.7	VPGQS[a]	$4x10^{-7}$
Trichloroethene(B2)	5	MCL	$6x10^{-7}$
Vinyl Chloride(A)	2	MCL	$4.6x10^{-5}$
Bis(2-Ethyelhexyl) Phthalate(B2)	6[b]	MCL	$1x10^{-6}$
Arsenic(A)*	50	MCL	$1.1x10^{-4}$
Beryllium (B2)	4	MCL	$2.1x10^{-4}$
		SUM	$4.2x10^{-4}$

* Recent studies indicate that many skin tumors arising from oral exposure to arsenic are non-lethal and that the dose-response curve for the skin cancers may be sublinear (in which case the cancer potency factor used to generate risk estimates may be overestimated). It is Agency policy to manage these risks downward by as much as a factor of ten. As a result, the carcinogenic risk for arsenic at this Site has been managed as if it were one order or magnitude lower than the calculated risk. Consequently, the risk level for arsenic in the above table reflects a risk management factor.

Non-carcinogenic Contaminants of Concern (Class)	Interim Cleanup Level (ug/l)	Basis	Target Endpoint of Toxicity	Hazard Quotient
1,1,1-Trichoroethane(D)	200	MCLG	liver	0.06
1,1-Dichoroethene(C)	7	MCLG	liver	0.02
1,2-Dichloroethene (total)(D)	70	MCL[c]	blood	0.2
2-Butanone	170	VPGQS[a]	fetotox	0.008
Acetone	3700	RB[d]	liver/kid.	1.0
4-Methylphenol	200	RB[d]	CNS	1.0
Antimony	6	MCL	blood	0.4
Chromium(Hexavalent)	50	VPGQS[a]	no obs. eff.	0.03
Manganese(D)	180	RB[d]	CNS	1.0
Nickel(B2)	100	MCL	wgt. gain	0.2
Vanadium(D)	0.2	RB[d]	no obs. eff.	1.0

SUMS	HI liver	1.1
	HI blood	0.6
	HI fetotox	0.0008
	HI Central Nervous System	2.0
	HI no observed effects	1.0
	HI weight gain	0.2

[a] Vermont Primary Groundwater Quality Standard - Enforcment Standard, Vermont Groundwater Protection Rule and Strategy

[b] Due to the presence of Bis(2-Ethylhexyl) Phthalate in the background groundwater at the Site (possible contamination from monitoring well materials), the cleanup levels will be 6 ug/l (MCL) or background, whichever is higher, as determined by the EPA and VT DEC during predesign and design activities.

[c] MCL is for cis-1,2-dichloroethylene.

[d] Risk-based.

While these interim cleanup levels are consistent with ARARs or suitable TBC criteria for groundwater, a cumulative risk that could be posed by these compounds may exceed EPA's goals for remedial action. Consequently, these levels are considered to be interim cleanup levels for groundwater. At the time that these Interim Groundwater Cleanup Levels identified in the ROD and newly promulgated ARARs and modified ARARs which call into question the protectiveness of the remedy have been achieved and have not been exceeded for a period of three consecutive years, a risk assessment shall be performed on the residual groundwater contamination to determine whether the remedial action is protective. This risk assessment of the residual groundwater contamination shall follow EPA procedures and will assess the cumulative carcinogenic and non-carcinogenic risks posed by ingestion of groundwater and inhalation of VOCs from domestic water usage.

If, after review of the risk assessment the remedial action is not determined to be protective by EPA, the remedial action shall continue until either protective levels are achieved and are not exceeded for a period of three consecutive years, or until the remedy is otherwise deemed protective. These protective residual levels shall constitute the final cleanup levels for this Record of Decision and shall be considered performance standards for any remedial action.

All Interim Groundwater Cleanup Levels identified in the ROD and newly promulgated ARARs and modified ARARs which call into question the protectiveness of the remedy and the protective levels determined as a

TABLE 3.1

CHRONOLOGY OF REMEDIAL CONSTRUCTION ACTIVITIES
PARKER LANDFILL SUPERFUND SITE
LYNDONVILLE, VERMONT

Date	*Event*
April 1999	Mobilization and Site Preparation
May 17 – May 24, 1999	Clearing and grubbing of Landfill and Borrow Areas
May 20, 1999 through project completion	Implement sediment & erosion control measures
May 20, 1999 through project completion	Stormwater and E&S controls
May 25 - June 4, 1999	Monitoring wells abandonment
June 3 – August 30, 1999	Waste regrading
June 15 – July 1, 1999	Perimeter security fence installation
June 16– July 12, 1999	IWS 2 excavation and consolidation in SWDA
June 21 – November 1, 1999	Subgrade layer placement (SWDA)
June 26, 1999	Asbestos Relocation
July 7 – 16, 1999	Gas extraction wells installation
July 15 – September 15, 1999	Landfill gas header collection piping
July 19 – August 5, 1999	Bottle/Debris Burning Area sampling, excavation and relocation
July 19, 1999	Settlement platform installation and monitoring
July 23, 1999 – June 26, 2000	BLHC layer placement
August 1999	Sedimentation Basin construction
August - November 1999	Benches, Downcomers, and Perimeter Drainage Ditch construction
September 15, 1999 – June 29, 2000	Flexible Membrane Liner installation (SWDA)
September 15, 1999 – June 5, 2000	GCL installation (SWDA)
September 28, 1999	Temporary gas collection system flare start-up
October 1, 1999 – July 11, 2000	GDN installation (SWDA)
October 6 – November 22, 1999	Protective Cover layer placement
October 19 – November 23, 1999	Vegetative Cover layer placement
December 8, 1999	LFG System Control Building construction
December 15, 1999	Permanent gas flare start-up
December 1999	Gas monitoring probe installation (GP-1 to GP-9)
February 29 – March 8, 2000	Gas Probe installation (GP-10 to GP-20, and PW-18 to PW-19)
May 2000	Spring repairs
May 15 – August 14, 2000	Protective Cover layer placement
May 15 – August 28, 2000	Vegetative Cover layer placement
May 22– June 9, 2000	Subgrade layer placement (IWS 3)
June 26, 2000(drilled), August 8, 2000 (online)	Gas extraction well W-8A installation

TABLE 3.1

CHRONOLOGY OF REMEDIAL CONSTRUCTION ACTIVITIES
PARKER LANDFILL SUPERFUND SITE
LYNDONVILLE, VERMONT

Date	*Event*
July 14 – 15, 2000	Flexible Membrane Liner installation (IWS 3)
July 14 – 18, 2000	GCL installation (IWS 3)
July 14 – September 27, 2000	Topsoil placement
July 18 – 19, 2000	GDN installation (IWS 3)
July 24 – September 27, 2000	Landfill caps hydroseeding
July 26 - October 4, 2000	Erosion Control Blanket placement
September 13, 2000	Final IWS 2 Confirmatory Sampling
September 26 - October 13, 2000	Compensatory Wetland construction
October 19, 2000	Borrow area hydroseeding
October 25 – 26, 2000	Wetland planting
October 26, 2000 - March 13, 2001	Interim LFG System O&M (Ethan Allen)
October 2000 - July 2001	Interim Site O&M (Ethan Allen)
October, 2000	Demobilization
November – December 2000	Winterization activities
March 14, 2001 - ongoing	LFG System O&M (Fairbanks)
May 21 – June 28, 2001	Spring repairs
June 20, 2001	Pre-Final Site Inspection
July 5, 2001	USEPA Acceptance of Pre-Certification Inspection
July 9, 2001	RA Report Submittal
July 19, 2001	Final Site Inspection

TABLE 4.1

CHRONOLOGY OF MAJOR EVENTS
PARKER LANDFILL SUPERFUND SITE
LYNDONVILLE, VERMONT

Date	*Event*
April 4, 1995	ROD signature
July, 1997	Consent Decree Lodging
May, 1999	RD submittal
May 1999	Mobilization and Site preparation
May 17 – December 10, 1999	1999 RC Activities
June 30, 1999	RD approval
September 28, 1999	Temporary LFG System Flare start-up
November 19, 1999	Notice of Violation (NOV) (Vermont water quality standards)
December 15, 1999	Permanent LFG System Flare start-up
December, 1999	Demobilization
January 2000	LFG System Flare stack testing – Round 1
February 16, 2000	Notice of Emergency (NOE) (Landfill Gas Migration)
May 2000	Mobilization and Spring Repairs
May 23 – October 24, 2000	2000 RC Activities
July 2000	LFG System Flare stack testing – Round 2
July 5, 2000 – March 13, 2001	LFG System downtime 117 hours (98 percent operational)
August 2000 - March 13, 2001	Interim LFG System O&M (Ethan Allen)
October 2000	Harding Demobilization
November 2000	LFG System and landfill cap substantially operational and functional
November 2000 - May 2001	Winterization Activities (Ethan Allen)
November 2000 to July 2001	Interim Site O&M (Ethan Allen)
March 14, 2001 - ongoing	LFG System O&M (Fairbanks)
May - June 2001	Spring Repairs (Ethan Allen)
May 28, 2001	USEPA Termination of NOE
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Groundwater

4.0 PRE-FINAL AND FINAL SITE INSPECTIONS AND CERTIFICATION

The following sections provide details pertaining to the pre-final and final inspections, the status of the pre-final inspection check-list, as well as construction certification.

4.1 PRE-FINAL SITE INSPECTION

The pre-final inspection was performed on September 7, 2005. Representatives from Vermont American Corporation, EPA, VTDEC, and URS were present during this inspection. The *Pre-Final Inspection Report* was provided to the EPA on September 21, 2005.

4.2 FINAL PUNCH LIST AND RESOLUTIONS

The pre-final inspection identified the following items requiring completion prior to EPA certifying substantial completion. The completion items and associated dates are summarized below:

Item Number	Item	Description	Completed Date
		BNA Area	
1	Clean Harbors Roll-Off	Remove empty roll-off container	9/15/05
2	Seed & Mulch Access Road	Final seeding and mulching of BNA access road in field, bare or thin grass areas at BNA and frac tank area	10/11/05
3	BNA Electrical VT Inspection	Inspection of electrical system by VT inspector	9/8/05
4	Disposal of Water	Load and haul water from frac tank for offsite disposal	10/5/05
5	Frac Tanks Removal	Remove empty frac tanks	11/11/05
6	Injection System	Complete assembly of BNA injection system	9/16/05

7	As-Built Survey	Survey BNA wells to determine top of well elevation	10/18/05
8	BNA System Operations Testing	Perform BNA wet testing (w/o amendment addition), collect extraction well samples for injection dose characterization	9/16/05
9	Erosion Repairs	Repair gullies and conduit trench erosion	9/26/05

PRB Area

10	Disposal of Solid Waste	Remove roll-off container with construction waste	10/11/05
11	Seed & Mulch PRB	Seed and mulch bare or thin grass areas at PRB	10/11/05
12	As-Built Survey	Install and survey PRB end pins	10/17/05
13	Office Trailers	Remove office trailers and reseed trailer area	12/7/05
14	Erosion Repairs	Fill gullies at PRB, construct diversions berms, repair end of ditch erosion and re-grade perimeter road	9/26/05

Wetland Area

15	Plant Shrubs	Plant shrubs required by wetland design	9/13/05
16	Seed and Mulch	Seed and mulch disturbed areas adjacent to wetland	9/20/05
17	Excavated Inlet	Excavate the inlet berm of the wetland (see Section 3.1.4)	2006

Stream Crossing Area

18	Erosion Repairs	Install stone check dams on north side, diversions and regrading on south side and fill gullies on slopes	9/29/05
19	Pipe Let-Down	Construct diversion ditch and pipe on south side	10/7/05
20	Seed and Mulch	Seed and mulch bare, thin-grass and disturbed areas	10/11/05
21	Stream Repair	Hand excavate sediment adjacent to stream	9/27/05